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10/530,221	05/18/2005	Onn Haran	2823/34	2933
<div>7590      10/09/2007</div> <div>Mark Friedman Bill Polkinghorn 9003 Florin Way Upper Marlboro, MD 20772</div> <div>EXAMINER CEHIC, KENAN</div> <div>ART UNIT      PAPER NUMBER</div> <div>2616</div> <div>MAIL DATE      DELIVERY MODE</div> <div>10/09/2007      PAPER</div>				

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/530,221

Applicant(s)

HARAN ET AL.

Examiner

Kenan Cehic

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 09/09/2005.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Objections*

1. Claim 3-15 are objected to because of the following informalities:

Claim 6-15, are objected because of incorrect numbering, since claim number 6 is missing.

When claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not). **Misnumbered claims 7-15 have been renumbered 6-14 and for purposes of examination claims depending on missing claim 6 are treated as dependent on claim 4.**

For claim 3, the claim limitation “an available credit” in line 2 seems to refer back to “an available credit” in claim 2 line 3. If this is corrected it is suggested to change this limitation to –said available credit--.

For claim 4, the claim limitation “an under utilization allocation scheme” in line 1 seems to refer back to “an under utilization allocation scheme” in claim 1 line 7. If this is corrected it is suggested to change this limitation to –said under utilization allocation scheme--.

For claim 5, the claim limitation “an over-utilization allocation scheme” in line 1 seems to refer back to “an over-utilization allocation scheme” in claim 1 line 8. If this is corrected it is suggested to change this limitation to –said over-utilization allocation scheme--.

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For claim 6, the claim limitation "a grant" in line 1 seems to refer back to "a grant" in claim 4 line 2. If this is corrected it is suggested to change this limitation to --said grant--.

Similar problems exist in claim 7 line 1.

For claim 7, the claim limitation "a respective importance factor" in line 1 seems to refer back to "a respective importance factor" in claim 7 line 1. If this is corrected it is suggested to change this limitation to --said grant--.

For claim 14, the claim limitation "bandwidth" in line 6 seems to refer back to "bandwidth" in claim 14 line 4. If this is corrected it is suggested to change this limitation to --said bandwidth--.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 2 recites the limitation "said requests" in line 2. There is insufficient antecedent basis for this limitation in the claim.

3. Claim 7 recites the limitation "said highest importance ONU" in line 6. There is insufficient antecedent basis for this limitation in the claim.

It is not clear which highest importance ONU the applicant is referring to.

4. Claim 10 recites the limitation "said ONU respective importance" in line 4. There is insufficient antecedent basis for this limitation in the claim.

It is not clear which ONU respective importance the applicant is referring to.

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5. Claim 13 recites the limitation "said handling" in line 2. There is insufficient antecedent basis for this limitation in the claim.

It is not clear which handling the applicant is referring to.

6. Claims 3 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

For claim 3, there is a lack of antecedent basis, for the claim limitation "said updated report value" in line 7.

### ***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

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8. Claim 14 rejected under 35 U.S.C. 102(e) as being anticipated by Wang et al. (US 2004/0052274), hereinafter Wang.

For claim 14, Wang discloses, in an Ethernet (see section 0010 lines 8-12 "Ethernet" and section 0030 7-11 "Ethernet") passive optical network (see section 0009 lines 1-3 "PON") that includes a plurality of optical network units (ONUs) (see Figure 1, ONU 1-n and section 0013 lines 9-12 "ONUs") interacting (see Figure 1, ONU 1-n are connected to 12 via 18) with an optical line terminal (OLT) (see Figure 1, 12), a method for dynamically (see section 0036 lines 8-14 "dynamic bandwidth management") allocating bandwidth (see section 0052 line 16 "allocate bandwidth") by the OLT (see section 0052 lines 11-17 "OLT...allocate bandwidth" and section 0052 lines 1-3 "Channel allocation.... for each ONU") to the ONUs (see section 0052 lines 11-17 "OLT...allocate bandwidth" and section 0052 lines 1-3 "Channel allocation.... for each ONU") in an under-utilization state ( see section 044 lines 7-12 "enable ONUs to exceed ...rate in instances of low network utilization" ) of a cycle (see section 0050 lines 6-9 "OLT allocated channels on a per-cycle basis" and see section 0023 lines 12-14 "bandwidth allocated to a given ONU....number of channels allocated to that ONU"), comprising the steps of:

- a) determining (see section 0051 lines 11-14 "OLT may use this information") the importance (see section 0051 lines 11-17 "prioritization information...SLA information") of each ONU ( see section 0051 lines 1-6 "ONUs") and

b) allocating bandwidth (see section 0051 lines 11-17 "allocate bandwidth in a preferential manner") based on said importance (see section 0051 lines 11-17 "prioritization information...SLA information").

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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9. Claim 1, 4- 6, 8, 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al. (US 2004/0052274) in view of Profumo et al. (US 7,016,356), hereinafter Profumo.

For claim 1, Wang teaches a method for dynamic (see section 0036 lines 8-14 “dynamic bandwidth management”) bandwidth allocation (see section 0052 line 16 “allocate bandwidth) in a passive optical network (see section 0009 lines 1-3 “PON”) that includes a plurality of optical network units (see Figure 1, ONU 1-n and section 0013 lines 9-12 “ONUs”) coupled (see Figure 1, ONU 1-n are connected to 12 via 18) to an optical line terminal (OLT) (see Figure 1, 12), the method (see section 0036 lines 8-14 “dynamic bandwidth management”) comprising the steps of: by the OLT(see section 0052 lines 11-17 “OLT...allocate bandwidth” and section 0052 lines 1-3 “Channel allocation.... for each ONU”), in each given cycle (see section 0050 lines 6-9 “OLT allocated channels on a per-cycle basis” and see section 0023 lines 12-14 “bandwidth allocated to a given ONU....number of channels allocated to that ONU”):

a) calibrating (see section 0051 lines 11-17 “use this information...in combination with SLA information”) requests (see section 0051 lines 3-6 “requests”) issued (see section 0051 lines 3-6 “ONUs may transmit requests”) by each of the ONUS (see section 0051 lines 3-6 “ONUs may transmit requests”) to obtain (see section 0051 lines 6-8 “OLT may use this information”) respective calibrated requests (see section 0051 lines 6-8 “OLT may use this information...to prioritize traffic” and section 0051 lines 11-17 “use this information...in combination with SLA information...to...allocate bandwidth”) ;



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b) allocating a bandwidth amount (see section 0051 lines 11-17 “allocate bandwidth”) to each ONU (section 0050 lines 6-9 “OLT allocated channels...to the ONUs” and see section 0023 lines 12-14 “bandwidth allocated to a given ONU....number of channels allocated to that ONU”) based on said calibrated requests (see section 0051 lines 6-8 “OLT may use this information...to prioritize traffic” and section 0051 lines 11-17 “use this information...in combination with SLA information...to...allocate bandwidth”) using an allocation scheme (see section 0044 lines 2-12 “OLT...to increase bandwidth”, “OLT may...constrain the ONUs”) selected from the group (see section 0044 lines 2-12 “OLT...to increase bandwidth”, “OLT may...constrain the ONUs”) consisting of an under utilization allocation scheme (see section 0044 lines 7-12 “OLT...to increase bandwidth of each ONU...in instances of low network utilization”, ) and an over-utilization allocation scheme (see section 0044 lines 2-12 “OLT may...constrain the ONUs during periods of high network utilization”); and

As regarding claim 4, Wang discloses step of allocating bandwidth (see section 0051 lines 11-17 “allocate bandwidth”) using an under utilization allocation scheme (see section 0044 lines 7-12 “OLT...to increase bandwidth of each ONU...in instances of low network utilization”, )

As regarding claim 5, Wang discloses , wherein said step of allocating bandwidth (see section 0051 lines 11-17 “allocate bandwidth”) using an over utilization allocation

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scheme (see section 0044 lines 2-12 “OLT may...constrain the ONUs during periods of high network utilization”)

As regarding claim 6, Wang disclose includes adding an additional amount of bytes (see section 0043 lines 5-6 “contiguous channels”) to a requested amount of bytes (see section 0042 lines “ONU 1.. may request additional channels”), said additional amount (see section 0043 lines 5-6 “contiguous channels”) correlated with an ONU importance (see section 0051 lines 6-17 “allocate bandwidth in a preferential manner”, “prioritize traffic”)

As regarding claim 8, Wang discloses In an Ethernet (see section 0010 lines 8-12 “Ethernet” and section 0030 7-11 “Ethernet) passive optical network (see section 0009 lines 1-3 “PON”), a method for dynamically allocating bandwidth (see section 0052 line 16 “allocate bandwidth”) to a plurality of optical network units (see Figure 1, ONU 1-n and section 0013 lines 9-12 “ONUs”) a) per each grant cycle (see section 0050 lines 6-9 “OLT allocated channels on a per-cycle basis” and see section 0023 lines 12-14 “bandwidth allocated to a given ONU....number of channels allocated to that ONU”), responsive to the requests (see section 0051 lines 3-6 “requests”) of each ONU (see section 0051 lines 3-6 “ONUs”), determining an uplink (see section 0044 lines 3-5 “ONUs to enable them to transmit more data”) utilization state (see section 0044 lines 8-12 “low network utilization”, “high network utilization”) that includes a state (see section 0044 lines 8-12 “low network utilization”,

“high network utilization”) selected from the group of underutilization ( see section 0044 lines 7-12 “enable ONUs to exceed ...rate in instances of low network utilization” ) and over-utilization (see section 0044 lines 8-12 “high network utilization”); and b) running independently a bandwidth allocation scheme (see section 0044 lines 8-12 “OLT may adjust the bandwidth”) correlated with said uplink (see section 0044 lines 3-5 “ONUs to enable them to transmit more data”) utilization state (see section 0044 lines 8-12 “low network utilization”, “high network utilization”), said bandwidth allocation scheme (see section 0044 lines 8-12 “OLT may adjust the bandwidth”) selected from the group (see section 0044 lines 8-12 “low network utilization”, “high network utilization”) of respectively an under-utilization allocation scheme (see section 0044 lines 8-12 “exceed committed information rate ...in...low network utilization”) and an over-utilization allocation scheme (see section 0044 lines 8-12 “constrain ONUs...high network utilization”).

As regarding claim 10, Wang discloses in a case of said under-utilization (see section 0044 lines 8-12 “exceed committed information rate ...in...low network utilization”) each of said ONUs (see Figure 1, ONU 1-n and section 0013 lines 9-12 “ONUs”) is associated with an importance parameter (see section 0051 lines 11-17 “prioritization information...SLA information “), and wherein said step of running (see section 0044 lines 7-13 “constrain the ONUs”) an under-utilization scheme (see section 0044 lines 7-

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13 “high network utilization”) includes handling said ONUs (see section 0044 lines 7-13 “constrain the ONUs”) based on each said ONU (see Figure 1, ONU 1-n and section 0013 lines 9-12 “ONUs”) respective importance (see section 0051 lines 11-17 “prioritization information...SLA information....allocate bandwidth in a preferential manner to higher priority traffic”).

Wang does not disclose: as regarding claim 1, based on said bandwidth allocation, granting the ONUS a second plurality of constant delay grants per each said cycle; whereby said granting facilitates a tight jitter/delay guarantee and high fairness and eliminates grant loss; as regarding claim 4, includes assigning ,a grant based on a respective ONU request and on service level agreement (SLA) parameters based on a respective ONU importance; as regarding claim 6, said assigning a grant based on a respective importance factor includes adding an additional amount of bytes to a requested amount of bytes, said additional amount correlated with an ONU importance.

As regarding claim 4, wherein said step of allocating bandwidth using an under utilization allocation scheme includes assigning ,a grant based on a respective ONU request and on service level agreement (SLA) parameters based on a respective ONU importance

As regarding to claim 5, wherein said step of allocating bandwidth using an overutilization allocation scheme includes calibrating all said ONUS to provide a grant size that will fairly satisfy service level agreements (SLAs) of all said ONUS, thereby providing high uplink utilization.

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As regarding claim 8, optical network units that are granted grants by an optical line terminal (OLT) in response to requests.

Profumo from the same or similar field of endeavor teaches a method for assigning bandwidth with the following features:

As regarding claim 1, Profumo discloses based on said bandwidth allocation (see column 6 lines 15-18 “ “ bandwidth assignment ...modified by command sent to...” ), granting (see column 6 lines 25-28 “constant grant rate”) the ONUS (see column 7 lines 1-3 “Grants...transmitted to the PSs” and see column 1 lines 20-25 “Peripheral Stations” and column 3 lines 19-24 “invention...suitable...PON systems”; PS is a downstream station just like ONU, where the invention can be applied to a PON, multiple PSs can be granted grants) a second plurality of constant delay grants (see column 6 lines 25-28 “constant grant rate”) per each said cycle (see column lines 10-12 “(grant)...each slot”); whereby said granting facilitates (see column 6 lines 25-28 “constant grant rate”) a delay guarantee (see column 9 lines 23-26 “constant delay”) and high fairness (see column 2 lines 54-59 “fairness model”) and eliminates grant loss (see column 2 lines 46-53 “minimum guaranteed bandwidth”, column 3 lines 38-42 “cell loss probability”, and column 6 lines 48 “CBR traffic”).

As regarding claim 4, Profumo discloses step of allocating bandwidth (see column 4 lines 41-44 “dynamically assign”) using an underutilization scheme (see column 8 lines 17-24 “Bandwidth not assigned”) discloses includes assigning (see column 6 lines 25-28

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“assignment”), a grant (see column 6 lines 25-28 “constant grant rate”) based on a respective ONU request (see column 6 lines 15-18 “modified by a command sent to MAC master Processor”) and on service level agreement (SLA) parameters level (see column 2 lines 46-53 “guaranteed bandwidth allocation” and column 5 lines 41-44 “guarantee fulfillment of all traffic parameters”) based on a respective ONU importance (see column 7 lines 31-34 “PSs for that traffic priority”).

As regarding claim 5, Profumo discloses step of allocating bandwidth (see column 4 lines 41-44 “dynamically assign”) using an underutilization scheme (see column 8 lines 17-24 “Bandwidth not assigned”) includes calibrating (see column 2 lines 60-66 “can modulate...sending by the PS”; PS is configured to facilitate request/grant) all said ONUS (see column 7 lines 1-3 “Grants...transmitted to the PSs” and see column 1 lines 20-25 “Peripheral Stations” and column 3 lines 19-24 “invention...suitable...PON systems”; PS is a downstream station just like ONU, where the invention can be applied to a PON, multiple PSs can be granted grants) to provide a grant size (see column 6 lines 25-28 “constant grant rate”) that will fairly satisfy all. service level agreements (SLAs) (see column 2 lines 46-53 “guaranteed bandwidth allocation” and column 5 lines 41-44 “guarantee fulfillment of all traffic parameters”) of all said ONUS (see column 7 lines 1-3 “Grants...transmitted to the PSs” and see column 1 lines 20-25 “Peripheral Stations” and column 3 lines 19-24 “invention...suitable...PON systems”; PS is a downstream station just like ONU, where the invention can be applied to a PON, multiple PSs can be granted

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grants), thereby providing high uplink (see column 2 lines 28-37 "PSs to MS") utilization (see column 2 lines 28-37 "efficient use of all available transmission capacity").

As regarding claim 6, Profumo discloses said assigning a grant (see column 6 lines 25-28 "assignment ...constant grant rate") based on a respective importance factor (see column 7 lines 31-34 "PSs for that traffic priority").

As regarding claim 8, optical network units (see column 7 lines 1-3 "Grants...transmitted to the PSs" and see column 1 lines 20-25 "Peripheral Stations" and column 3 lines 19-24 "invention...suitable...PON systems"; PS is a downstream station just like ONU, where the invention can be applied to a PON, multiple PSs can be granted grants) that are granted grants (see column 7 lines 1-3 "Grants...transmitted to the PSs" ) by an optical line terminal (OLT) (see column 4 lines 64-67 "MS" and column 3 lines 19-24 "invention...suitable...PON systems") in response to requests (see column 7 lines 64-67 "Activation..Pending Request...corresponds to activation of a Pending Grant").

As regarding claim 8, Profumo discloses optical network units (see column 7 lines 1-3 "Grants...transmitted to the PSs" and see column 1 lines 20-25 "Peripheral Stations" and column 3 lines 19-24 "invention...suitable...PON systems"; PS is a downstream station just like ONU, where the invention can be applied to a PON, multiple PSs can be granted grants) that are granted grants (see column 6 lines 25-28 "constant grant rate") by an optical line terminal (OLT) (see column 6 lines 54-57 "Master Processor...MAC Master processor" and column 3 lines 19-24 "invention...suitable...PON systems) in response

to requests (see column 7 lines 64-67 "Activation..Pending Request...corresponds to activation of a Pending Grant").

It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system of Wang et al. by using the features, as taught by Profumo et al., in order to provide ... (see column 2 lines 28-37).

10. Claim 2, 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al. (US 2004/0052274) in view of Profumo et al. (US 7,016,356) as applied to claim 1 above, and further in view of Kiremidjian et al (US 2003/0081623), hereinafter Kiremidjian.

For claim 2, Wang and Profumo teach the claimed invention as described in paragraph 9. Additionally, Wang and Profumo discloses, as regarding claim 2, wherein in each said cycle (see section 0050 lines 6-9 " a per-cycle basis"), each said ONU (see section 0051 3-6 "ONUs") issues a report (see section 0051 3-6 "ONUs") to said OLT (see section 0051 3-6 "OLT") and wherein said step of calibrating requests (see section 0051 lines 6-8 "OLT may use this information...to prioritize traffic" and section 0051 lines 11-17 "use this information...in combination with SLA information...to...allocate bandwidth").

As regarding claim 3, Wang and Profumo discloses for each said ONU (see column 5 lines 21-24 "each PS" and and see column 1 lines 20-25 "Peripheral Stations" and column 3 lines 19-24 "invention...suitable...PON systems"; PS is a downstream station



just like ONU, where the invention can be applied to a PON, multiple PSs can be granted grants):

reading (see column 6 lines 3-4 “MAC processor using these inputs”) a requested amount of bytes (see column 5 lines 33-40 “Requested dynamic bandwidth”) that represent a current report value (see column 5 lines 21-24 “bandwidth need for dynamic bandwidth allocation” and see column 5 lines 33-40 “Requested dynamic bandwidth”) of said report (see column 5 line 24 “message ...Request”);

ii. estimating a queue occupancy (see column 7 lines 28-37 “mirrored queue status related to each PS....queue of a PS is not empty”) by updating (see column 8 lines 17-25

“Bandwidth ...is distributed in equal shares to all PSs”) said report value (see column 5 lines 21-24 “bandwidth need for dynamic bandwidth allocation” and see column 5 lines 33-40 “Requested dynamic bandwidth”) based

on grants issued (see column 8 lines 17-25 “no Pending Grant is active..” and “Grants are assigned....to all PSs that have an active Pending Request”; this includes any grants that have (or have not ) been granted in any previous time slot) by the OLT (see column 7 lines 14-15 “MAC master processor” and column 3 lines 19-24

“invention....suitable...PON systems”) in an immediately preceding cycle (see column 4 lines 10-14 “generates...grant...in each slot”);

iv. adjusting (see column 7 lines 46-59 “modifies counter starting value) each said request (see column 7 lines 31-34 “requests”) to achieve a guaranteed service level (see column 2 lines 46-53 “guaranteed bandwidth allocation” and column 5 lines 41-44 “guarantee fulfillment of all traffic parameters”).

Wang and Profumo do not disclose: as regarding claim 2, includes limiting said requests by an available credit.

Kiremidjian from the same or similar field of endeavor teaches a method for traffic shaping for multiple service agreement policies with the following features:

As regarding claim 2, limiting said requests (see section 0035 lines 2-6 “virtual queue...accumulates...packets” ) by an available credit (see section 0035 lines 2-6 “available credit”).

As regarding claim 3, wherein said limiting requests (see section 0035 lines 2-6 “virtual queue...accumulates...packets” ) of said requests (see section 0035 lines 2-6 “virtual queue...accumulates...packets” ; user is requesting to send packets however can not due to available credit) by an available credit (see section 0035 lines 2-6 “available credit”) is preceded by the following:

iii. by the OLT (see column 7 lines 14-15 “MAC master processor” and column 3 lines 19-24 “invention...suitable...PON systems”), using said available credit (see section 0035 lines 2-6 “available credit”) to account for said updated report value (see section 0035 lines 1-8 “queue count”, “decrement”, “increment”);

It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system of Wang et al. and Profumo et al by using the features, as taught by Kiremidjian et al., in order to provide ... (see section 0015).

11. Claim 7, 9, 11-13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al. (US 2004/0052274) in view of Profumo et al. (US 7,016,356) as applied to claim 1 above, and further in view of Rinchiuso et al (US 6,920,119), hereinafter Rinchiuso.

For claim 7, 9, 11-13 Wang and Profumo teach the claimed invention as described in paragraph 9 and further:

As regarding to claim 7, wherein said assigning (see column 6 lines 25-28 “assignment” of Profumo) a grant (see column 6 lines 25-28 “constant grant rate” of Profumo) based on a respective

importance factor (see column 7 lines 31-34 “PSs for that traffic priority” of Profumo).

Additionally, Wang and Profumo teach the ONU (see Figure 1, ONU 1-n and section 0013 lines 9-12 “ONUs” of Wang)

For claim 9, Wang and Profumo disclose step of determining an uplink see section 0044 lines 3-5 “ONUs to enable them to transmit more data”) utilization (see section 0044 lines 8-12 “low network utilization”, “high network utilization”) includes comparing (see column 8 lines 17-25 “Bandwidth not assigned ....when...no Pending Grant is active”) a sum of all said requests (see column 8 lines 17-25 “no Pending grant is active”) with a size (see column 8 lines 17-25 “Bandwidth not assigned”) of said cycle (see column 7 lines 60-61 “each time slot”) said under-utilization (see column 8 lines 17-25 “Bandwidth not assigned...according to...mechanism”) occurs when said sum of all requests (see column 8 lines 17-25 “no Pending Grant is active”) is smaller (see column 8 lines 17-25 “no Pending Grant is

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active”) than said cycle (see column 7 lines 60-61 “each time slot”) size (see column 8 lines 17-25 “Bandwidth not assigned”).

As regarding claim 11, Wang discloses handling of said ONUS (see section 0051 lines 1-7 “ONUs”) based on their respective importance (see section 0051 lines 11-17 “prioritization information...SLA information”) further includes determining (see section 0052 lines 11-17 “OLT...allocate bandwidth” and section 0052 lines 1-3 “Channel allocation.... for each ONU”) a grant size (see section 0049 lines 2-5 “at least some bandwidth”) per each said cycle (see section 0049 lines 2-5 “each cycle”) by adding a given amount of bytes (see section 0049 lines 2-7 “dynamically adjusting the bandwidth of ONUs”) to each said ONU (see section 0049 lines 2-7 “dynamically adjusting the bandwidth of ONUs”), said addition of bytes (see section 0049 lines 2-7 “dynamically adjusting the bandwidth of ONUs”) based on said respective importance (see section 0051 lines 11-17 “use this information...SLA information...allocate bandwidth in a preferential manner to higher priority traffic”).

As regarding claim 13, Profumo discloses step of running (see column 8 lines 17-22 “Bandwidth...is distributed”) an under-utilization scheme (see column 8 lines 17-21 “Bandwidth not assigned”) further includes stopping said handling (see column 8 line 17-22 “Bandwidth not assigned ...to previously described mechanism”) after a cycle (see column 7 lines 60-61 “each time slot”) in which a said grant (see column 8 lines 17-22 “Pending Grant”) equals said cycle size grant (see column 8 lines 17-22 “Bandwidth not assigned ...Pending Grant...is distributed equal shares”).

Wang and Profumo are silent about:

As regarding claim 7 and 12, a) running a first loop from a lowest to a highest said importance factor, to provide an input variable; b) using said input variable, running a second loop over all said ONUS, starting with said highest importance ONU, to provide an indication if a grant can be increased; and c) if a respective ONU grant can be increased, increasing said respective ONU grant with a configurable byte amount.

As regarding claim 13, step of running an under-utilization scheme further includes stopping said handling after a cycle in which a said grant equals said cycle size.

Rinchiuso from the same or similar field of endeavor teaches and allocation method with the following features:

As regarding claim 7 and 12, Rinchiuso discloses running a first loop (see Figure 5a 509-511) from a lowest to a highest (see Figure 5a "Priority to user", 509a) said importance factor (see Figure 5a , 509a), to provide an input variable (see Figure 5a 510 and 512); b) using said input variable (see Figure 5a 510 and 512), running a second loop (see Figure 5b, 516) over all said ONUS (see Figure 5b 519a "Users"), starting (see Figure 5b, 519a and 519c) with said highest importance ONU (see Figure 5b, 519a and 519c), to provide an indication if a grant (see Figure 5b, 519a) can be increased (see Figure 5a, 512); and c) if a respective ONU (see Figure 5b 519a "Users") grant can be increased (see Figure 5a, 512), increasing said respective

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ONU grant (see Figure 5b, 519a) with a configurable byte amount (see Figure 5b, 519b “Ni Data Frames”)

It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system of Wang et al. and Profumo et al. by using the features, as taught by Rinchiuso et al., in order to provide ... (see column 3 lines 34-37).

### *Conclusion*

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US-5,602,830 A	02-1997	Fichou et al.
US-6,064,652 A	05-2000	Buckland et al.
US-6,324,184 B1	11-2001	Hou et al.
US-2002/0030875 A1	03-2002	Kim et al.
US-2003/0048805 A1	03-2003	Yoshihara et al.
US-6,598,086 B1	07-2003	Bell et al.
US-2003/0133460 A1	07-2003	Lee et al.
US-2003/0170032 A1	09-2003	Song et al.
US-2003/0179769 A1	09-2003	Shi et al.
US-6,813,255 B1	11-2004	Goderis et al.

The above are referenced to show PON system and methods.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenan Cehic whose telephone number is (571) 270-3120. The examiner can normally be reached on Monday through Friday 8:00-5:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kwang Yao can be reached on (571) 272-3182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KC

**KWANG BIN YAO**  
**SUPERVISORY PATENT EXAMINER**

A handwritten signature in black ink, appearing to read 'Kwang Bin Yao', is written over the printed name and title.